Diet Modification: An Introduction to Swallowing, the Future of Diet Modification, and the International Dysphagia Diet Standardization Initiative

An Honors Thesis (HONR 499)

by

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Abstract

Speech-Language Pathology is a vast field encompassing many disciplines. The scope of the field ranges from treating speech and language falling under the category of communication disorders, to swallowing. Swallowing disorders, called Dysphagia, have a huge impact on individuals globally, and affect individuals not only physically, but also mentally, emotionally, and socially as well. Professionals such as Speech-Language Pathologists can utilize various methods for treating swallowing disorders; the most common and well known being diet modification. This paper aims to provide readers with a basic introduction to the field of Speech-Language Pathology, a brief overview of the definition, assessment, and treatment of swallowing disorders, and additionally provide information on the future of swallowing disorders within Speech Pathology. It will include information on the newest initiative: the International Dysphagia Diet Standardization initiative, which focuses on creating standardized terminology for modified diets to be used internationally; and it will provide insight into the implications for students and newly graduated practitioners.

Acknowledgements

I would like to thank Mrs. Mary Ewing for advising me through this process of completing my thesis. I am tremendously grateful for her insight and all she has taught me throughout this semester. I could not have completed it without her.

I would also like to thank my parents, Chris and Stacy Pope, for supporting me in pursuing my dreams through education here at Ball State University, and to Brandon Johnson, for providing love, encouragement, and perspective throughout my time here.

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Introduction

There are thousands of individuals across the nation, and many more across the globe who suffer from common speech and language disorders, which include an array of many other disorders such as swallowing. In addition to those thousands of individuals, there are thousands of practicing Speech-Language Pathologists (SLPs) working to assist those individuals in bettering their speech and language capabilities. The goal of this research is to examine the roles of an SLP in regards to their practice within the discipline of swallowing. More specifically, how they utilize and influence diet modification amongst patents with the swallowing disorder called Dysphagia. This paper will examine and explore where the field is currently, where it is heading in the near future, how it impacts individuals with Dysphagia, and how it impacts those who are just joining the field as professionals.

Speech-Language Pathology: A Brief Introduction

To understand the field of Speech-Langue Pathology, it is important to know a little of the history. Though the profession did not declare itself until 1925, there is a rich history of individuals practicing long before that date (Duchan). Before Speech-Language Pathology was considered an official profession, many clinicians were in fact not certified due to the lack of status of the profession. Many looked to gain knowledge and understanding through their own professions that were official such as teaching, medicine, or elocution (Duchan). Elocution is essentially "the art of public speaking" or "a style of speaking especially in public" ("Definition Of ELOCUTION").

section. This felt a bit overwhelming at times due to the amount of documents I had created.

As I mentioned before, my immersive learning project played a key role in the topic I chose, so I included it in my thesis. I specifically discuss the connection to the IDDSI framework and implementation. This was incredibly meaningful for me, because I was able to see my research in action, and I had real world experience of why this initiative matters. Working in the group focusing on pediatrics, I know that swallowing has huge impacts on the development of infants, and it can be dangerous when infants are unable to swallow correctly. I also discovered that the means of thickening their formula is widely varied currently, and is not as accurate as professionals would like it to be. This is why research, and especially why IDDSI is so important. Over time, this research will create more distinct guidelines for modified diets, one of the most widely used therapy practices. This will allow for patients of all ages to remain safe while consuming food and liquids.

Overall, the thesis was both daunting and meaningful. It was a challenge to plan out a schedule for myself, and it was even harder making decisions one what to include in my thesis. However, the information I gained in this process is invaluable to my future as a Speech-Language Pathologist. Though our undergraduate program does not have much coursework on swallowing, I feel very prepared, through these experiences, to learn more about swallowing. I feel as though I now have a baseline of knowledge that I can put into practice in graduate school and beyond. I am thankful for my thesis advisor, and those who supported myself during this time of growth and education.

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Some notable names in the profession were Samuel Potter; Sara Stinchfield; Elijah Corlet, a Boston School master; Alexander Melville Bell; and his son, Alexander Graham Bell, both of whom were elocutionists. In addition, Alexander Melville Bell is credited with the creation of the method of Visible Speech, which "provided a visible code indicating the position of the throat, tongue, and lips in the production of various speech sounds" (Duchan).

Many of the early practicing clinicians studied work of Europeans who were also known as "speech doctors" (Duchan). Clinics were located in multiple areas across Europe such as in Germany and Austria. The field was picking up speed, and new realms were emerging such as the publication focusing on speech disorders, called The Voice, established by Edgar Werner in America. Special interest groups were formed and affiliated with the National Education Association (NEA), creating the National Society for the Study and Correction of Speech Disorders in 1918. Another group that formed called National Association of Teachers of Speech (NATS) was the group that became the American Speech-Language Association (ASHA) in 1925. It was originally named American Academy of Speech Correction (AASC), and consisted of 25 members (Duchan). ASHA is now currently

> The national professional, scientific, and credentialing association for 191,500 members and affiliates who are audiologists; speech-language pathologists; speech, language, and hearing scientists; audiology and speech-language pathology support personnel; and students. Audiologists specialize in preventing and assessing hearing and balance disorders as well as providing audiologic

treatment, including hearing aids. Speech-language pathologists identify, assess, and treat speech and language problems, including swallowing disorders ("About The American Speech-Language-Hearing Association (ASHA)").

So these early Speech Pathologists paved a way for the profession to emerge and grow into a hugely important association that not only provides invaluable resources, but also aids many individuals in the habilitation and rehabilitation of communication.

What is a Speech-Language Pathologist?

According to the American Speech-Language and Hearing Association (ASHA) "Speech Language Pathologists (SLPs) work to prevent, assess, diagnose, and treat speech, language, social communication, cognitive-communication, and swallowing disorders in children and adults" ("The Profession of Speech-Language Pathology"). These speech disorders are present in individuals that are unable to produce speech correctly or fluently, and he or she can have difficulty with voice and/or resonance. Language disorders are diagnosed in persons who have trouble expressing themselves through thoughts, ideas, and feelings, or when he or she has difficulty understanding others. The former is considered expressive language, while the latter is considered receptive language ("The Profession of Speech-Language Pathology").

In order to practice Speech-Language Pathology, an SLP must obtain a masters degree in Speech-Language Pathology, complete a clinical fellowship year, pass the Praxis exam, and obtain their Clinical Certificate of Competence otherwise known as their CCC, along with any other vocational specific licensure. These licensed SLPs are

able to work in a variety of settings with a variety of individuals. They have the capability to work in research, education, and health care settings, and can work with a variety of ages including birth through geriatric. Their roles depend on the specific job, and they can work with several different types of populations ("The Profession of Speech-Language Pathology"). According to ASHA,

> Because of the high demand for speech-language pathology services, part-time, full-time, and "as needed" basis opportunities may be available depending on location, desired facility, employment flexibility, and other factors. In many settings, SLPs often work as part of a collaborative, interdisciplinary team, which may include teachers, physicians, audiologists, psychologists, social workers, physical and occupational therapists, and rehabilitation counselors ("The Profession of Speech-Language Pathology").

Essentially, there is a lot of flexibility within the field of Speech Pathology, and many practicing SLPs enjoy the opportunity to explore multiple different roles over the course of their career. According to the Occupational Outlook handbook, "Employment of speech-language pathologists is projected to grow 21 percent from 2014 to 2024, much faster than the average for all occupations" ("Speech-Language Pathologists : Occupational Outlook Handbook: : U.S. Bureau Of Labor Statistics"). In addition, "Speech-language pathologists held about 135,400 jobs in 2014. About 2 out of 5 speech-language pathologists worked in schools in 2014. Most others worked in healthcare facilities, such as hospitals" ("Speech-Language Pathologists : Occupational Outlook

Handbook: : U.S. Bureau Of Labor Statistics"). One area this paper will focus on, and one area SLPs play a major role in, is the evaluation and treatment of swallowing disorders.

Swallowing Disorders

A swallowing disorder, otherwise known as dysphagia, is essentially a disorder where the individual has difficulty or an inability to swallow food and drink. ("Faqs From The Dysphagia Committee") This can include any of the phases involved in the process of swallowing. These phases include: the oral phase, pharyngeal phase, and the Esophageal phase. The oral phase consists of the actions of sucking, chewing, and moving food or liquid to the throat. The pharyngeal phase consists of starting the swallowing reflex, pushing food down the throat, closing off the airway so no aspiration or choking occurs. And lastly, the esophageal phase consists of the relaxing and tightening of the sphincters of the esophagus and moving the food through the esophagus to the stomach. ("Swallowing Disorders (Dysphagia) In Adults")

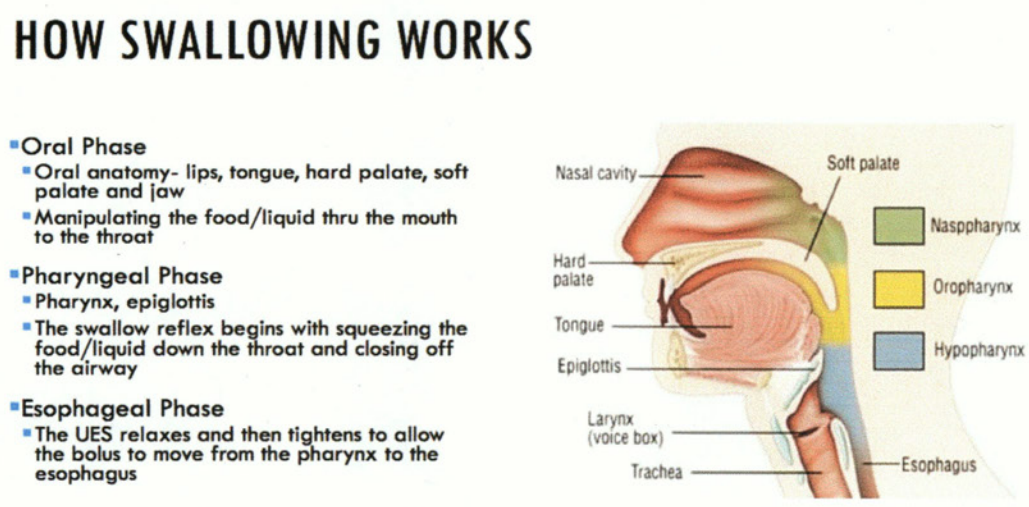

Figure 1 (Ewing, 2017)

There are two major classifications of Dysphagia including oropharyngeal dysphagia, characterized by difficulty passing solids and liquids from the mouth to the esophagus, and esophageal dysphagia, characterized by difficulty passing solids or liquids through the esophagus. It is important to note that Dysphagia is not a feeding disorder, which would include difficulty in food entering the mouth, but rather a disorder of swallowing ("Faqs From The Dysphagia Committee").

Dysphagia is characterized by symptoms such as: "coughing during or right after eating or drinking, wet or gurgly sounding voice during or after eating or drinking, extra effort or time needed to chew and swallow, food or liquid leaking from the mouth, or getting stuck in mouth, recurring pneumonia or chest congestion after eating, and weight loss or dehydration from not being able to eat enough" ("Swallowing Disorders (Dysphagia) In Adults"). Because of these symptoms, many individuals with dysphagia may experience: "poor nutrition or dehydration, risk of aspiration (food or liquid entering the airway), which can lead to pneumonia and chronic lung disease, less enjoyment of eating or drinking, and embarrassment or isolation in social situations involving eating" ("Swallowing Disorders (Dysphagia) In Adults"). The ability to properly swallow is incredibly important to humans, and inability to do so will affect physical, social, and emotional wellbeing of those suffering from the disorder. ("Swallowing Disorders (Dysphagia) In Adults")

The incidence of dysphagia is about 13.5% of the general population of the United States, but varies among populations. It is found to be much higher in more disordered populations such as stroke patients at 29-64%, people with multiple sclerosis at 24-34%, and in patients with Parkinson's at 81%. There is little data on a global scale

because of variance in different geographical locations. IDDSI research suggests around 8% of the population worldwide suffer from Dysphagia (560 million) ("What is Dysphagia?"). However, dysphagia is a disorder that can affect any age group, from infant to geriatric, any gender, and any ethnicity or race ("Faqs From The Dysphagia Committee").

As seen in the incidence data, it is much more common for those with dysphagia to have another disease or disorder associated with it, referred to as comorbidity. Two categories that would be comorbid with Dysphagia include damage to the nervous system, or problems affecting the head and neck. These other disorders include: stroke, brain injury, spinal cord injury, Parkinson's disease, multiple sclerosis, amyotrophic lateral sclerosis (ALS), muscular dystrophy, cerebral palsy, Alzheimer's disease, cancer in the mouth, throat, or esophagus, reflux, blockage or narrowing of the esophagus, and injury involving the head and neck ("Swallowing Disorders (Dysphagia) In Adults").

Some general treatments of Dysphagia include: "specific swallowing treatment (e.g., exercises to improve muscle movement), positions or strategies to help the individual swallow more effectively, specific food and liquid textures that are easier and safer to swallow." The final treatment mentioned is also referred to as diet modification that will be discussed further in the paper. ("Swallowing Disorders (Dysphagia) In Adults")

Assessment and Diagnosis of Swallowing Disorders

There are many assessment tools that Speech-Language Pathologists (SLPs) can use in clinical practice to evaluate swallowing, and aid in diagnosing cases of dysphagia. Though swallowing is within the scope of practice of a licensed SLP, the SLP must have

specific training to specialize in swallowing disorders, and must have all of the qualifications required by the facility and state they are practicing in. They must have proof of competence of skills needed to administer and interpret the results of the evaluation ("Roles Of Speech-Language Pathologists In Swallowing And Feeding Disorders: Technical Report"). It is both their professional and ethical responsibility to achieve necessary documentation and licensure to ensure they are trained fully in the different types of evaluation. ("Roles Of Speech-Language Pathologists In Swallowing And Feeding Disorders: Technical Report").

First, the SLP will complete a medical, developmental, and family history with the family or individual to gain any insight into symptoms and possible causes for those symptoms. They will additionally evaluate the strength and coordination of muscles and general anatomy used in swallowing. This will then be followed by observation of behaviors of eating including posture, oral movements, attitudes about eating, etc. typically identified during a clinical swallow evaluation. And lastly, if necessary, perform specialized tests ("Pediatric Dysphagia: Assessment").

There are two main instrumental tools used in the evaluation process, which include a Modified Barium Swallow, and Fiberoptic Endoscopic Evaluation of Swallowing (FEES). The first mentioned is a Modified Barium Swallow, also known as a Video Fluoroscopic Swallowing Exam (VFSE), where an "individual eats or drinks food or liquid with barium mixed with it, and then the swallowing process is viewed on an X-ray" (ACR). This specific x-ray is a movie-type x-ray, where the individual evaluating the client can watch a video of the swallow in motion. This can give the SLP a clear picture of whether there is a delayed swallow, any uncoordinated swallowing

motions, or aspiration occurring. They can observe any food or liquid entering the trachea (airway), or if residue remains in the pharynx and esophagus (ACR). The patient will swallow various consistencies of food and liquid that contains barium, such as nectar or honey thick barium, or a cookie coated with barium. When evaluating, the SLP is assessing for a safe and effective swallow (ACR). This method is performed on a variety of ages, birth through geriatric, and primarily used to evaluate swallowing function.

VFSS IMAGES

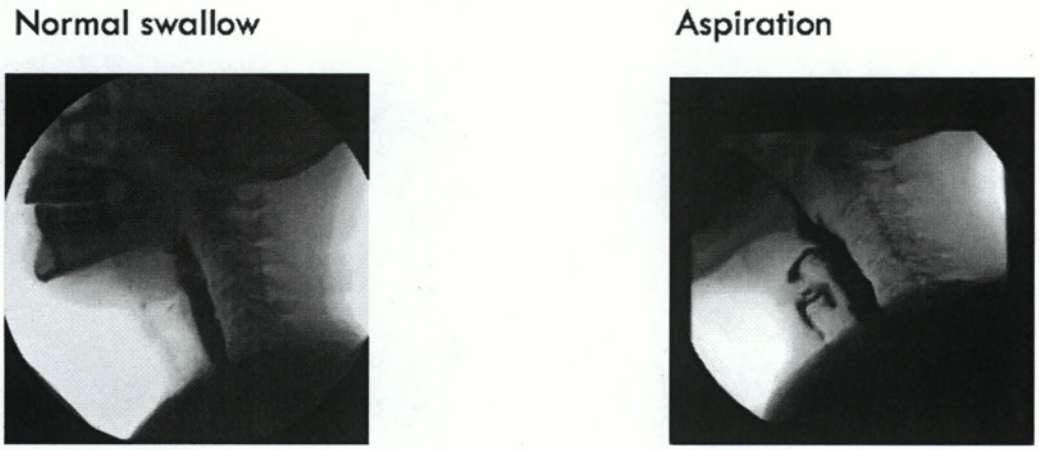

Figure 2 (Ewing, 2017)

The second evaluation is the Fiberoptic Endoscopic Evaluation of Swallowing (FEES). This exam can be performed by an SLP or with an ear, nose, and throat (ENT) doctor. According to the ASHA Technical Report, "Physicians use endoscopy for functional evaluation of swallowing and/or to assess the integrity of the laryngeal and pharyngeal structures in order to render a medical diagnosis" ("Roles Of Speech-

Language Pathologists In Swallowing And Feeding Disorders: Technical Report"). During this exam, the patient is in a comfortable position, and the SLP slowly and carefully maneuvers a small, flexible telescope through the nasal cavity down to the throat. At the end of the tube, there is a small camera and light, and it is wired to a computer for recording purposes. While the tube is in place, the SLP will have the patient consume food and drink, possibly colored green or blue for easier visual reference, to determine if there is residue being left behind, or if coughing due to aspiration occurs. They will assess the throat and structures involved in swallowing, and will often test sensory responses utilizing puffs of air. The SLP cannot actually observe aspiration while it occurs because the epiglottis (a flap-like structure) closes over the airway to protect it during the swallow. They will be able to determine afterwards when the epiglottis is relocated if there is residue in the airway, especially if food coloring was used ("Endoscopic Evaluation Of Swallowing"). Once all of the testing has been completed, an SLP will make the diagnosis of Dysphagia as necessary. The responsibility is to then determine the etiology of the disorder, if it is sensory or motor, which phase of the swallow causes aspiration or uncoordinated swallowing to occur, long term goals, and any other relevant information that could be beneficial to creating a treatment plan ("Feeding And Swallowing Disorders (Dysphagia) In Children"). The task for the SLP is then to create an effective and individualized treatment plan for the client based on his or her needs.

Current Standards in Diet Modification

As mentioned before, one of the treatment options offered to clients with Dysphagia is diet modification. Currently in the field of Speech-Language Pathology, the terminology for diet modification in Dysphagia varies from country to country. So, globally there is no standardized naming of the different thicknesses of food and liquids. In addition, the "properties of foods and liquids that impact swallowing safety have not been defined or measured in the US," and that "guidelines for diet prescription for patients with dysphagia have not been established" (Tymchuck, 2011). While some initiatives such as the National Dysphagia Diet in 2002 and the International Dysphagia Diet Standardization Initiative in 2015 work to create standard consistencies to use in practice, neither of these is officially endorsed by ASHA. It is incredibly important that caregivers and professionals across the country and the globe have the same knowledge and understanding of what consistencies of food and drink are safe for individuals with Dysphagia.

Though there is no standard currently, many facilities and companies that retail thickener in the United States use terms such as "thin," "nectar," "honey," and "spoon/pudding thick" to describe a thickness in liquids, while they used pureed and soft to describe food defined as part of the National Dysphagia Diet (NDD). The liquid itself is measured by checking the viscosity of the liquid, or rather how thick the liquid is or how easily it flows. This can be determined using the viscometer and is measured in centipoise (cP). Thin liquids can range anywhere from 0-50 cP, nectar can range from 51-350 cP, honey from 351-1750 cP, and spoon thick 1751 or more cP. According to the Essential Puree website, a nectar thick liquid "coats and drips off a spoon like a

lightly set gelatin. This consistency requires a little more effort to drink than thin liquid" ("The National Dysphagia Diet: Guidelines for Puree", 2015). It is overall much more manageable and easier to control than a thin liquid, and will flow through a straw or nipple. A honey thick would flow off of the spoon like actual honey in a ribbon-like fashion, and is difficult to drink through a standard straw. Spoon or pudding thick would mostly stay on the spoon when tipped, but still moves when the spoon is shaken. It would be a challenge to get these liquids through even a larger straw ("The National Dysphagia Diet: Guidelines for Puree", 2015).

For food, the classifications become even more varied. Two common diets used outside of the standard diet most people eat, are the Dysphagia Advanced Soft Diet and the Dysphagia Mechanical Soft Diet. The Dysphagia Advanced soft consists of foods that are "of "nearly regular" textures with the exception of very hard, sticky or crunchy foods. This texture requires chewing and tongue control. Foods should be tender and easy to break into pieces with a fork" ("The National Dysphagia Diet: Guidelines for Puree", 2015). The other diet is the Mechanical Soft diet, otherwise known as a minced or moist diet. According to the NDD this would include:

> Meats need to be chopped or ground. Vegetables need to be well cooked and easily chewed. Foods should be in small pieces (1/4" or 5mm). No hard, chewy, fibrous, crisp or crumbly bits. No husk, seed, skins, gristle or crusts. No "floppy" textures such as lettuce and raw spinach. No foods where the juice separates from the solid upon chewing, like watermelon ("The National Dysphagia Diet: Guidelines for Puree", 2015).

There can also be one more classification referred to as "pureed" or "extremely thick," where all food should be pureed into a cohesive, smooth texture similar to a pudding-like texture. It should not contain lumps and it shouldn't be sticky. "The prongs of a fork make a clear pattern when drawn across the surface of the puree" ("The National Dysphagia Diet: Guidelines for Puree", 2015).

This information represents the United States' "current standard," and the definitions for modified diets vary globally. In a study conducted over the development of international terminology, specifically in tandem with IDDSI, it was reported that the most common number of levels of classification was between three and four levels, which encompassed fifty-four different names for food, and greater than three levels for drink with twenty-seven different names (Cichero, Lam, Steele, Hanson, Chen, Dantas, Duivestien, Kayashita, Lecko, Murray, Pillay, Riquelme, & Stanschus, 2016). By creating a standard, the network of professionals can begin to "reduce misunderstanding and ambiguity and to improve communication efficiency" (Chichero et al., 2016).

IDDSI

IDDSI stands for the International Dysphagia Diet Standardization Initiative, which is a group of professionals across several disciplines, and volunteers who are collaborating to create an international standardized system of terminology and definitions for the texture of modified foods and liquids, both thickened and unthickened, for individuals diagnosed with dysphagia ("About Us"). Some of the disciplines include: nutrition and dietetics, medicine, speech pathology, occupational therapy, nursing, patient safety, engineering, as well as food science and technology, all across the globe ("About

Us"). The two co-chairs of the initiative include Peter Lam (RD, CFE), a registered dietitian and credentialed food service executive in Vancouver, BC, Canada, and is a project lead for Canadian Dysphagia Diet Terminology Standardization Terminology Project, and Dr. Julie Cichero (SLP), a specialist in dysphagia research from Australia, who led development of Australian standardized terminology and definitions for texture modified foods and fluids ("IDDSI Board"). The two co-chairs, along with the board members, who represent several countries, are responsible for the development and progress of the movement. IDDSI is also sponsored by several national societies, professional associations, and business sponsors ("IDDSI Community"). The professional associations include: The Academy of Nutrition and Dietetics, Africa Alzheimer's Congress, American Speech-Language and Hearing Association, British Dietetic Association, Canadian Association of Nutrition Management, Dietitians Association of Australia, Dietitians of Canada, Irish Association of Speech & Language Therapists, Irish Nutrition & Dietetic Institute, Lung Association Australia, Speech-Language and Audiology Canada, Speech-Language and Hearing Association Singapore, Speech Pathology Australia, and World Congress on Healthy Ageing. The sponsors for this initiative include: Nestlé Health Science, Hormel Foods—Thick & Easy, App Data Room, Simply Thick, Campbell's Foodservice, Apetito, Burlodge, Food Care Co., Maple Leaf Foodservice, Sysco, Dr. Oetker Professional, Flavour Creating, Gordon Food Service, Lyons Magnus, Nutri Co., Ltd., Precise Thick-N, Pulmuone Co., Ltd ("IDDSI Community").

Their objective aims to standardize names used in describing textures, to focus on individuals rather than the profession as a whole, and to create and utilize a common

language that can be utilized by anyone in the treatment process for dysphagia. According to ASHA, their association and global associations currently do not have "established diet levels or terminology, nor does ASHA have any guidelines about the types of foods that should be on a particular diet level" ("Dysphagia Diets").

Essentially this means that every professional and nonprofessional across the globe who researches modified diets will have easily understood and accessible information on diet standards for individuals with dysphagia. Any person of any culture or language will be able to understand what type of texture the food or drink should be. This is incredibly important because there is a huge lack of standardized terminology, labels, and numbers, which can cause confusion internationally, and even from facility to facility within the same town. This may cause complications and inconsistencies in the treatment of individuals with dysphagia.

The entire "framework" for IDDSI is based off of the acronym "MAPA" which represents "monitor," "aware," "prepare," and "adopt." The goal of the initiative is to have these standards and implement them within the next two to three years time.

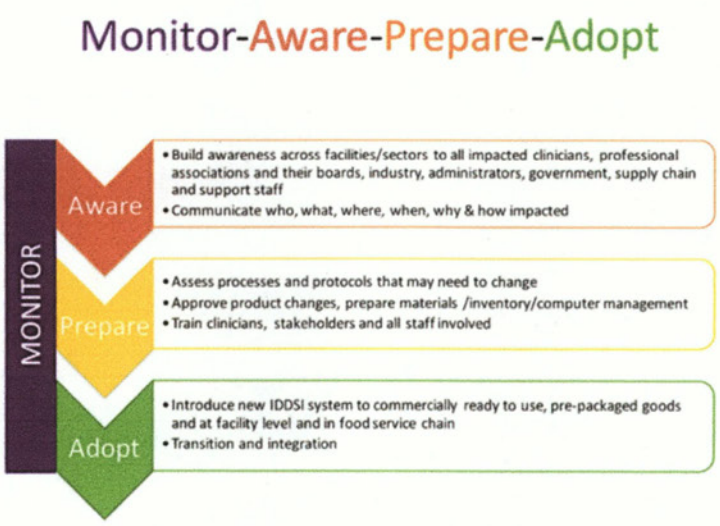

Figure 3 ("Framework", 2017)

IDDSI Flow Test and Classifications

One way to test the viscosity of a liquid and measure it in the IDDSI standard is to use a gravity flow test. An SLP, nurse, or other professional will use a standard 10mL syringe with the plunger removed, fill it with the liquid being tested to the 10mL line, keep a finger on the bottom so no liquid escapes, let the liquid flow for ten seconds, then replace finger at the bottom. The amount left in the syringe in mL will correspond to the chart of classifications provided by IDDSI ("Drink Testing Methods", 2017).

The IDDSI committee has developed a classification system that will be implemented with the rest of the initiative. It will have classifications for both food and drink numbered 0 through 7 that correspond with the IDDSI gravity flow test mentioned above. For liquids, 0 will represent a "thin" liquid, such as water, and will correspond to the IDDSI flow test for under 1mL. A 1 represents "slightly thick" liquids, or milk like liquids, which corresponds to 1-4mL remaining in the syringe, following the flow test. A 2 represents a "mildly thick" liquid, similar to the nectar thick liquid, which is 4-8mL remaining in the syringe. A 3 is "moderately thick" liquid, similar to a honey consistency, with 9mL remaining. And a 4 is "extremely thick," or a spoon thick liquid, with 10mL left in the syringe. In the first figure below, found on the IDDSI website, it shows the syringe, along with the numbers associated with each classification. The other shows how the test is performed (Complete IDDSI Framework Detailed definitions, 2017).

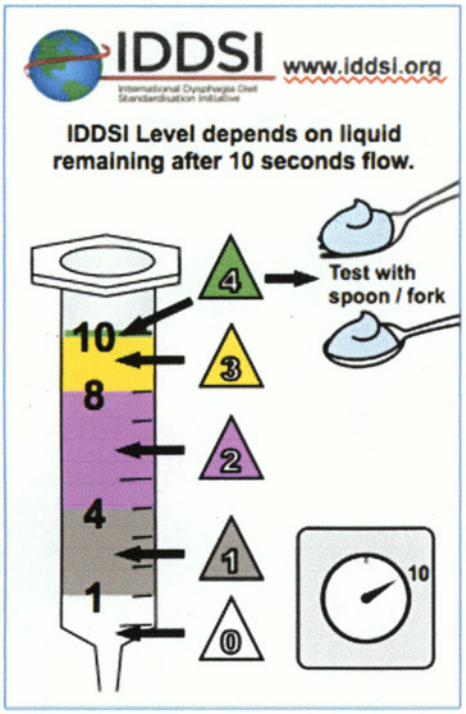

Figure 5 ("Resources", 2017)

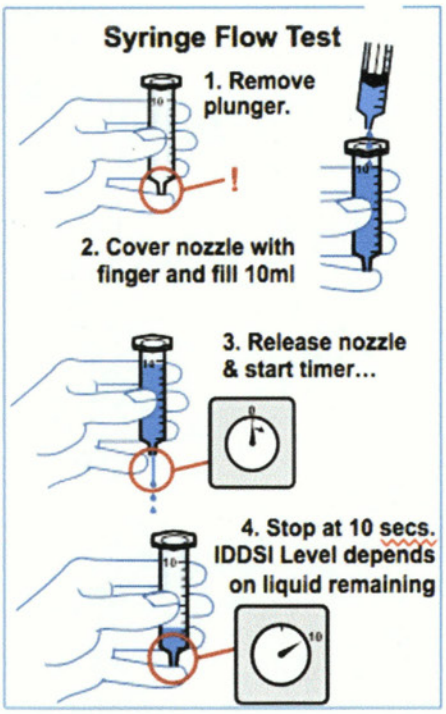

Figure 4 ("Resources", 2017)

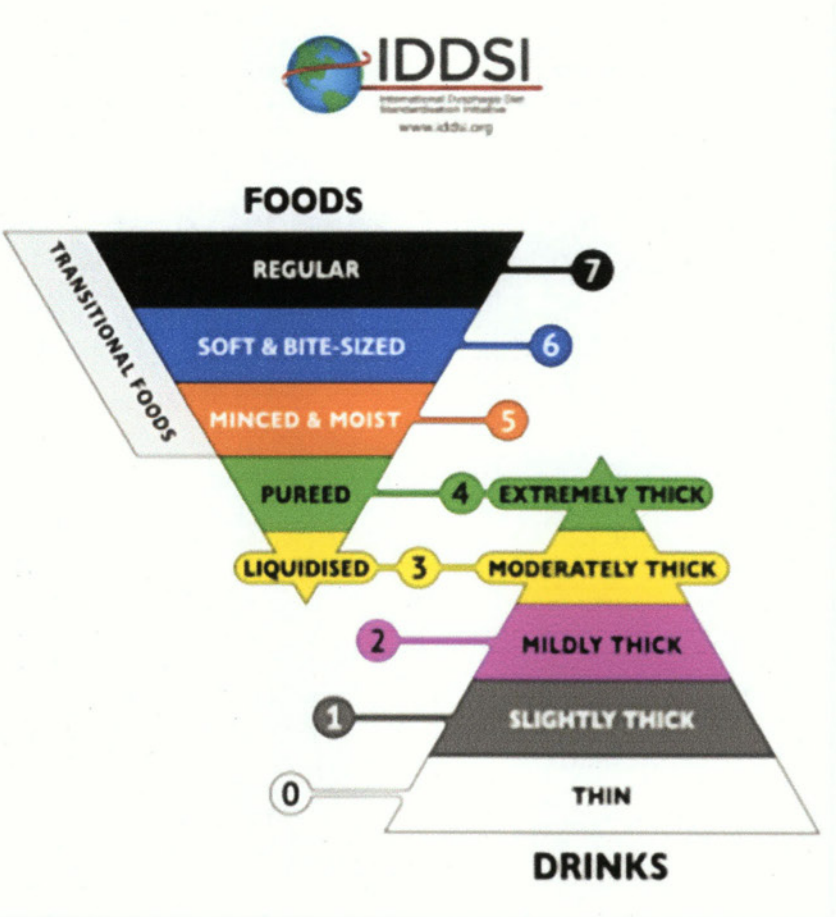

Figure 6 (Tymchuck, 2011)

The classifications for food are numbered 3-7 with overlap in the liquids category. Food that is considered "liquidized" is classified as a 3, similar to a "moderately thick" liquid. "Pureed" is a 4, which is an "extremely thick" liquid. "Minced and Moist" is a 5, "Soft & Bite-Sized" is a 6, and "Regular" foods are a 7 ("Drink Testing Methods", 2017).

Other Testing Methods

Other testing methods can be utilized to test the viscosity of liquids such as a Line Spread Test (LST), which is done on a flat surface using material such as plexi glass that has premeasured concentric circles with .25inch spacing. A cylinder of some sort, such as a PVC tube, is then placed in the center of the innermost circle and then filled with liquid. The tube is then lifted and the liquid is allowed to spread. This lasts for thirty seconds to a minute, and then measurements are taken from each quadrant. The numbers that are averaged are used to determine how viscous the liquid is, the higher numbers found toward the center show the liquid to be less viscous, and low numbers, found toward the outer circles, show a more viscous liquid (Ewing, M., 2017). Though this test can give an idea of how viscous the liquid is, it can only be used to give a broad categorization, but cannot measure accurate fluid viscosity (Nicosia and Robbins 306-311). To achieve the most accurate measure of viscosity, one must use a viscometer. A viscometer is an instrument that measures viscosity in centipoise, and can provide information on temperature, torque, and viscosity throughout a twenty-three minute test run. Though both are valid tools, they are not specifically used for IDDSI testing.

Food testing is also necessary for individuals on a modified diet. The first method is referred to the "Fork Drip Test," where "Thick drinks and fluid foods can be tested by

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Food testing is also necessary for individuals on a modified diet. The first method is referred to the "Fork Drip Test," where "Thick drinks and fluid foods can be tested by assessing whether they flow through the slots/prongs of a fork and comparing against the detailed descriptions of each level" ("Food Testing Methods",2017). The second is the "Fork Pressure Test and Spoon Pressure Test," where, for hard or firm food,

> Is best used to assess foods in Levels 4-7 and transitional foods. The slots/gaps between the tines/prongs of a standard metal fork typically measure 4 mm, which provides a useful compliance measure for particle size of foods at Level 5 – Minced & Moist ("Food Testing Methods", 2017).

Next is the "Chopstick Test" which can be used to replace a fork if unavailable. And lastly the "Finger Test" can be incorporated to help make testing more accessible in multiple countries ("Food Testing Methods",2017).

Overall, both classifications for liquids and foods in the IDDSI framework are meant to be a more accessible and recognizable naming system that can be used internationally, and by any professional working with individuals with Dysphagia.

What This Information Means for Students and Newly Graduated Practitioners

This initiative has already presented opportunities for current students at Ball State University to participate in projects associated with IDDSI. For several years now, Ball State University in Muncie, IN has created interdisciplinary immersive learning projects across various departments. The goal of these projects is to create hands on learning

opportunities, while also allowing interdepartmental cooperation. One of these projects has been available to students for multiple semesters focusing on departments such as physics, speech-language pathology, and dietetics working collaboratively to test and create recipes for thickened liquids used in diet modification. The project aims to test common thickeners used in hospitals and care facilities, to determine if the viscosities of liquids combined with thickeners correspond with the viscosities of Varibar Barium used in hospital swallow evaluation studies.

The project group tests liquids used in diet modification for multiple age levels including pediatrics. In regards to pediatrics, the goal is test infant formulas combined with rice cereal, a common thickener for formulas. What many students are discovering is that the thickeners, especially rice cereal, are not completely matching the evaluation viscosities, causing confusion and potentially a lot of harm for patients on a modified diet. Many publications are stating the same ideas, that there is "poor correlation between the viscosity of thickened liquids used during video- fluoroscopic tests and the viscosity of liquids prepared to the same target levels for patients during mealtime" (Garcia, J. M., Chambers, E., & Molander, M., 2005). Initiatives like IDDSI are promoting testing methods and terminology to hopefully simplify the process of thickening liquids and make it more accessible to many different groups.

This initiative should be fairly simple for current students and newly graduated practitioners to implement. Because of age, and years they are attending school, they will learn this initiative during their time at a university, and will be more ready to accept it as the new standard. Because of lack of experience in the field, they are not going to have to fight against years of doing diet modification a certain way, they will already be in the

habit of implementing these standards. In addition, they may be able to help those already in the field implement this new initiative, creating a smoother transition for IDDSI to be implemented.

Conclusion

Overall, this initiative, and diet modification in general, can be a tremendous asset to those who are suffering from Dysphagia. This will impact not only physical health of those individuals, but also his or her mental and emotional health as well. It can be very challenging to know that one's body is not performing in the way it is supposed to, and it is incredibly difficult when what is being prescribed is not effective. By creating standards, and by testing thickeners on the market, one should hopefully have the ability to get a diagnosis, have the ability to purchase products they know will work, and have the ability to get help anywhere across the globe. This will also assist professionals in their evaluation and treatment of clients with dysphagia. They will improve their communication with other professionals across the country and across the globe. While diet modification is far from a perfect method of treatment, it should be recognized that there are many dedicated professionals working hard to create new standards that will hopefully improve this area of treatment, and better the lives of individuals suffering from Dysphagia.

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